LAN-1-2 / G
FG

Manager, Lake Andes NWR

February 17, 1970

Asst. Regl. Refuge Supvr., Twin Cities (RF)

Annual Water Program - 1970 - Lake Andes Refuge

Acting Regional Engineer Stevenson has provided comments on the water program for the Lake Andes Refuge in 1969. Please note that he has made corrections in the computations.

Please submit next year's data in the standard format requested.

With the above reservations, the 1970 water program is approved as submitted.

Carlsen 2/17

J. C. Carlsen

Attachment
JCCarlsen:mc 2-17-70

____Carpenter
____Greenwalt

____Carlsen
____Monnie
____Morgan

____Duncan
____Dundas
____Dybsetter
____Ellis
____Hoffman
____Reilly
____Rollings
____Winship
____Stenos

Regional Supervisor, Division of Wildlife Refuges February 16, 1970

EN-H-Lake Andes
Annual Water Program

Acting Regional Engineer

Lake Andes NWR - 1970 Annual Water Program

We have reviewed the subject program and have the following comments.

The manager did not submit the data in the form prescribed in this year's notice. Suggest that next year's report be submitted per the request from this Regional Office.

Brashears 2-16-70

Some errors in the total water use computation were noted and corrected. Corrected copy is attached.

Stevenson 2/16/70

Gauging records are greatly improved and are being submitted as requested last year.

Stephens 3-6-70

Edwin B. Stevenson

Attachment

cc:
Refuges--RO

SCBrashears:ce

ANNUAL WATER MANAGEMENT PLAN, 1970

A. GENERAL WATER USES

Lake Andes proper is divided into three management units by two dikes with control structures. The general flow of water is from the north unit to the south unit. The outlet for the lake is on the south side and flows to the Missouri River. A structure here enables the lake to be held at a maximum of 1437.25.

Owens Bay is seperated from the south unit of Lake Andes by a dike. A control structure in the dike permits us to control the water levels in Owens Bay. An artesian well flows int o Owens Bay and any excess water is discharged into the south unit of Lake Andes.

Approximately 25% of the flow from the artesian well is directed into Prairie Pond starting the first of April. This inundates low lands and increases pair and brood habitat on the refuge. The flow is stopped about the first of August.

NORTH UNIT

The water level in this unit showed a net increase of 2.86 feet for this 12 month period. In the spring, water from this unit flowed into the center unit.

Water conditions were excellent. Good production of sago pondweed, hardstem bulrush, and cattail were realized.

Breeding pairs on the unit numbered 36. The number of broods observed was 12.

During fall migration the unit was used heavily by redheads and canvasbacks. On October 17, 1050 canvasback and 500 redheads were recorded on this unit.

CENTER UNIT

The water level for this unit showed a net increase of 1.81 feet for 1969. Approximately 3500 acre-feet of water flowed into this unit from the north unit.

Water conditions for breeding pairs and broods were excellent. Breeding pairs numbered 202 this year compared to 110 in 1968. Brood

numbers in 1969 were 71 compared to 20 in 1968.

This year emergents and sago pondweed were abundant. Other vegetation such as smartweed, sunflower, and fireweed (Kochia), that had grown up on the dry lake shore were inundated this spring providing excellent escape cover for broods. Overwater nesting sites for grebes, coots, redheads, and canvasbacks were abundant.

Canvasbacks and redheads used the sago pondweed heavily this year. On November 5, 4,270 canvasbacks were recorded on this unit.

SOUTH UNIT

The water level for this unit showed a net increase of 1.05 feet for this period.

Emergent growth was scarce and sago pondweed production seemed to have declined this year.

The number of breeding pairs was 96 in 1969 compared to 310 in 1968. Brood use increased from 8 in 1968 to 28 in 1969.

OWENS BAY

Water levels in this unit fluctuate very little due to the constant flow of the artesian well. The maximum variation throughout the year was 1.23 feet. Any overflow from this unit enters the south unit.

Hardstem bulrush and some cattail are found in this unit. This year sago pondweed growth was very poor. The water in this unit remained clear throughout the summer.

The flow into Prairie Pond was initiated on April 8 and terminated on August 1; however, breaks in the dike necessitated shutting off the flow until repairs were made. A total of 49.8 acre-feet of water was diverted into Prairie Pond.

B. SUMMARY

A record amount of snowfall was recorded for South Dakota for the winter of 1968 - 69. However, due to the unfrozen ground much of this moisture soaked into the soil and runoff conditions did not meet expectations. The lake did, however, have a net gain of 19,305 acre-feet of water.

Fish were stocked into the north, center, and south units of Lake Andes. On April 16, 125,000 northern pike fry were stocked in the south unit and 125,000 in the center unit. On June 27, 99,000 black bass fry were stocked in the center unit and 30,000 in the north unit.

C. RECOMMENDATIONS FOR WATER MANAGEMENT IN 1970

Since water levels of Lake Andes are maintained soley by natural runoff, no recommendations for water management can be made for the north, center, or south units exept for maintaining the lake at the optimum level of 1436.75; this is .5 feet below the maximum outlet elevation of 1437.25. Due to local flooding complaints in high water years this .5 feet buffer zone is desirable. The levels in the Center unit this year, however seemed to be very condusive to aquatic plant and waterfowl production.

It is recommended that Owens Bay be maintained as close as possible to the maximum of 1440.00. This unit was not drawn down in 1969. Aquatic production was poor this year and a check on production next year would seem desirable.

The artesian well flow should be diverted into Prairie Pond starting about April 1. The flow should be continued into this area until about August 1.

IMPOUNDMENT DATA - 1969

	North Unit			Center Unit		
	Average Elevation	Area (acres)	Capacity (acre feet)	Average Elevation	Area (acres)	Capacity (acre feet)
January	1432.02	230	258	1428.86	1277	1513
February	1432.02	230	258	1428.86	1277	1513
March	1432.02	230	258	1428.86	1277	1513
April	1437.24	610	2691	1431.66	1803	6294
May	1436.55	582	2280	1431.75	1812	6465
June	1436.02	559	1969	1431.40	1774	5802
July	1435.85	550	1877	1431.27	1760	5555
August	1435.45	529	1664	1430.93	1722	4911
September	1435.04	508	1446	1430.41	1665	3926
October	1434.99	505	1420	1430.55	1681	4192
November	1434.97	504	1411	1430.63	1689	4343
December	1434.88	499	1368	1430.67	1694	4419

	South Unit			Owens Bay Unit		
January	1429.56	1473	3615	1439.66	168	253
February	1429.56	1473	3615	1439.66	168	253
March	1429.56	1473	3615	1440.38	206	393
April	1431.66	1579	6835	1440.89	222	501
May	1431.49	1576	6567	1440.58	213	435
June	1431.08	1562	5920	1440.35	205	387
July	1431.19	1566	6094	1440.37	206	391
August	1430.76	1547	5426	1440.30	204	376
September	1430.36	1527	4813	1440.21	201	357
October	1430.55	1537	5104	1440.56	212	431
November	1430.60	1539	5181	1440.63	214	431
December	1430.61	1540	5196	1440.66	215	452

SUMMARY OF INFLOW AND OUTFLOW 1969

	A Ave. Annual Evap.	B 1969 Lake Rise	C Net Gain A&B	D Surface Acres	E Ac-ft Gain CxD	F Outflow in ac-ft	G Total Inflow ac-ft E&F
Owens Bay	3.15	1.00	4.15	~~205~~ 209	~~851~~ 867	~~80~~	931
North Unit	3.15	2.86	6.01	549	3299	~~3500~~	~~6799~~ 3219
Center Unit	3.15	1.79	4.94	1745	8620	none	8620
South Unit	3.15	1.05	4.20	1556	6535	none	6535
Totals				4055	~~19,305~~ 19,321	~~3580~~	~~22,885~~ 19,321

Prairie Pond 25% of the well flow flowed into this area for 60 days, with the well flow at 750 gal/min, this would amount to 49.8 ac-ft.

1969 inflow - ~~22,885~~ 19,321 ac-ft
1969 outflow from the refuge (south unit) - 0 ac-ft.